

**SUPPLEMENTARY MATERIALS TO JOURNAL ARTICLE PUBLISHED IN  
HEALTH PROMOTION AND PRACTICE**

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**Harnessing Knowledge for Improving Access to Fruits and Vegetables in Farmers Markets: Interactive Data Visualization to Inform Food Security Programs and Policy**

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**Access to Data Source**

Through search tools on the USDA-AMS farmers website, the dataset of farmers market in the United States can be searched and obtained as a computer file. The USDA Farmers Market Directory is also available at <https://catalog.data.gov/dataset/farmers-markets-geographic-data> and dataset obtain from <https://apps.ams.usda.gov/FarmersMarketsExport/ExcelExport.aspx>

**Software for Visual Analytics**

The visualizations were designed and implemented in Tableau Desktop Professional ([www.tableau.com](http://www.tableau.com)). The Tableau packaged workbook file (with file extension .tbwx) containing the views and dashboards can be interacted with and downloaded from:

The Tableau packaged workbook file can also be opened and interacted with using the free and fully interactive Tableau Reader (<https://www.tableau.com/products/reader>).

Supplementary Visual Analytics Resource to this article is available at:  
[https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/infopage](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/infopage)

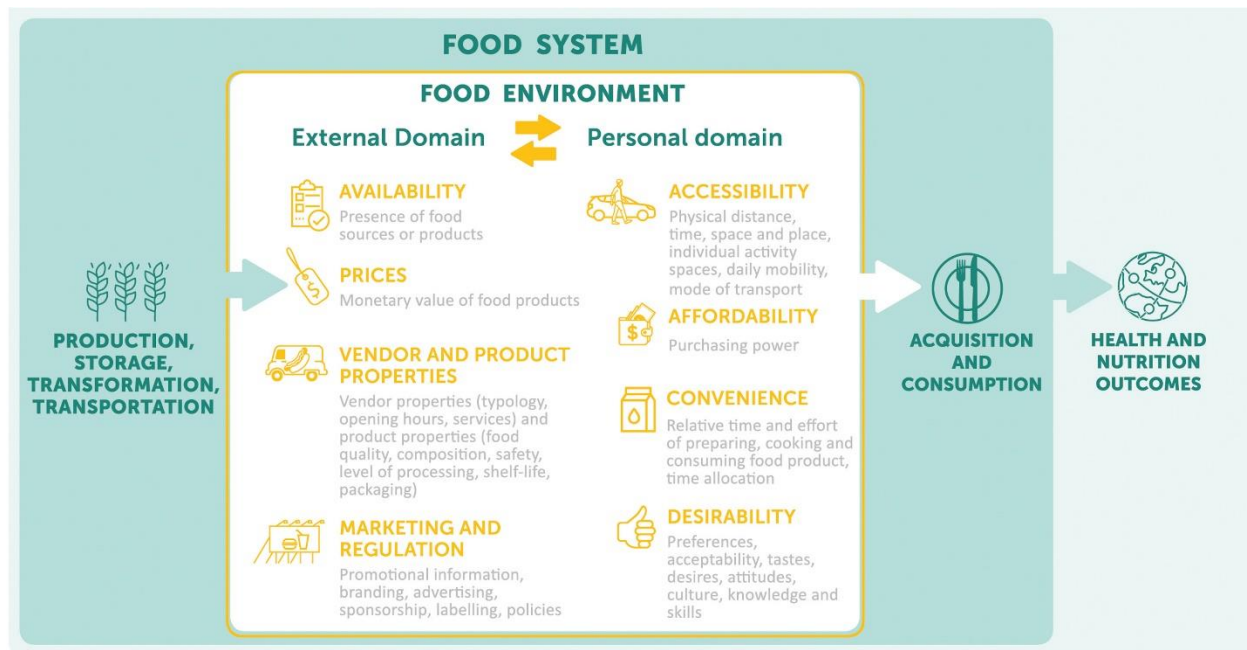
Tables and Figures are available as tabs on the Tableau Public site for the resource.

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## Supplementary Figure 1

(Relevant Section in Journal Article: Background)



**Supplementary Figure 1** The conceptual framework for the food environment. Reproduced with permission from Turner, C., Aggarwal, A., Walls, H., Herforth, A., Drewnowski, A., Coates, J., . . . Kadiyala, S. (2018). Concepts and critical perspectives for food environment research: A global framework with implications for action in low-and middle-income countries. *Global Food Security*, 18, 93-101. <https://www.sciencedirect.com/science/article/pii/S2211912418300154>

NOTE:

The conceptual framework by Turner et al. (2018) depicts the food environment as the interface within the wider food system. Key dimensions are mapped to external and personal domains. Interactions between these domains and dimensions shape people's food acquisition and consumption. The food environment conceptual framework is based on the socio-ecological theory.

In this article on harnessing the knowledge for improving access to fruits and vegetables at farmers markets in the United States Department of Agriculture (USDA) Farmers Market Directory, the conceptual framework of the food environment guides our investigation because of the alignment of our datasets and visualizations to the dimensions of availability, vendor properties, accessibility and affordability.

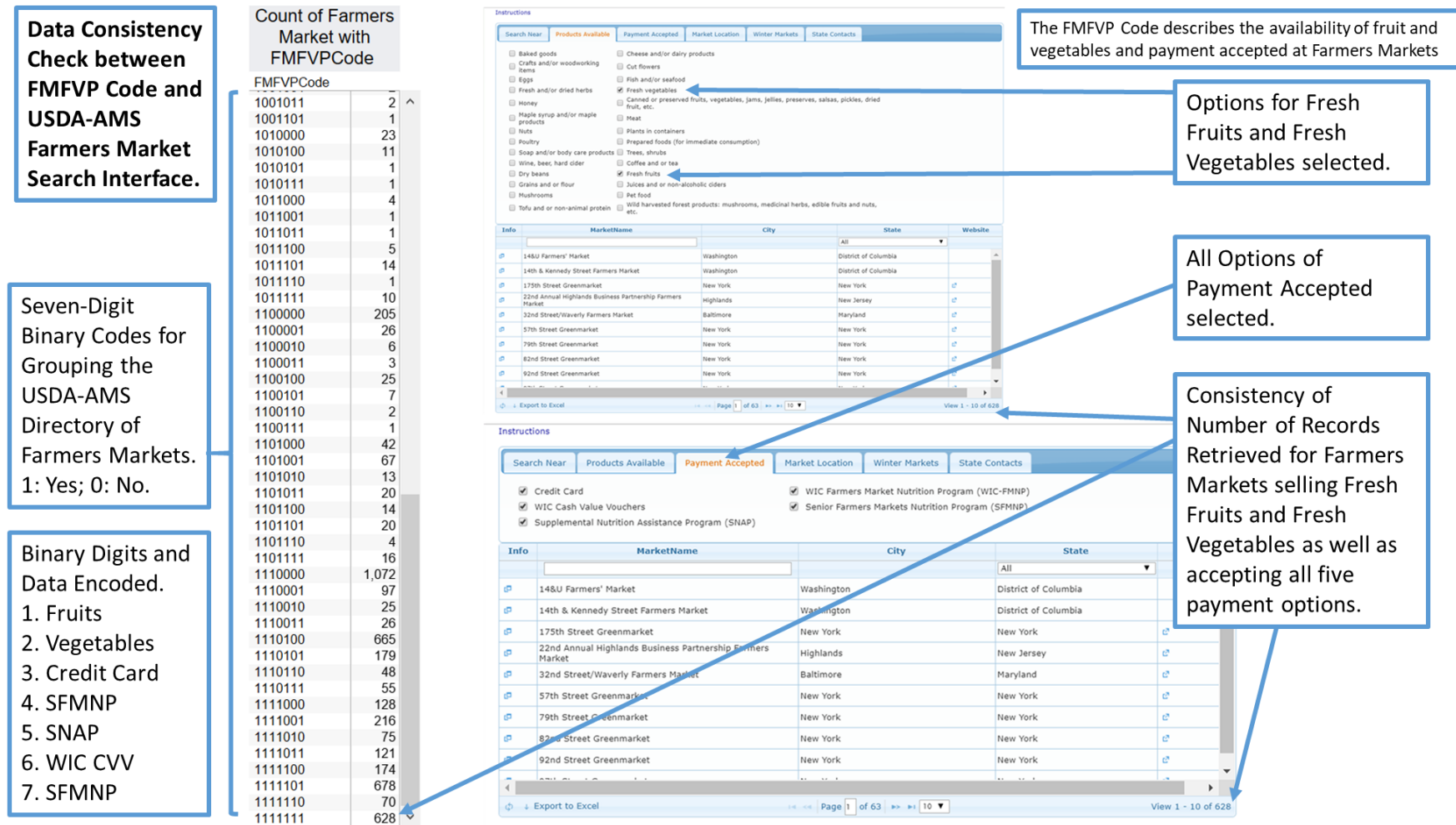
The specific measures in our investigation including availability of fruits and vegetables at farmers markets; payment types accepted by vendors at farmers markets; physical locations and social media presence of farmers markets; and food assistance programs for use at farmers markets.

Interactive resource available at

[https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/suppfigure1](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/suppfigure1)

## Supplementary Figure 2

(Relevant Section in Journal Article: Results - Subgroups of Farmers Markets by Patterns of Availability of Fruits, Vegetables and Payment Accepted)



**Supplementary Figure 2** Data Consistency Check between FMFVP Code and the USDA-AMS Farmers Market Search Interface.

NOTE: The figure demonstrates the consistency between this data investigation and the USDA-AMS Farmers Market Directory for the count of farmers market with vendors for fresh fruits and fresh vegetables as well as accepting all five payment options. Data as of December 21, 2018. Interactive visualization with data update on July 5, 2019 is available at [https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/supfigure2](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/supfigure2)

### Supplementary Table 1

(Relevant Section in Journal Article: Results - Farmers Markets Groups by Payment Accepted Score)

Profile of Payment Accepted Scores by Farmers Markets in Public Health Regions (1 to 5)\*

Public Health Region	State	FMPaymentScore					Farmers Market Count
		1	2	3	4	5	
Region 1	Connecticut	1	2	3	4	7	17
	Maine	1	1	1	5	0	8
	Massachusetts	0	0	1	13	10	24
	New Hampshire	2	9	0	0	0	11
	Rhode Island	0	0	2	2	2	6
	Vermont	0	4	1	2	0	7
Region 2	New Jersey	2	4	1	0	3	10
	New York	4	4	7	11	17	43
Region 3	Delaware	0	1	1	2	0	4
	District of Columbia	2	0	0	0	2	4
	Maryland	1	2	5	4	2	14
	Pennsylvania	3	2	5	3	0	13
	Virginia	10	11	3	0	1	25
	West Virginia	0	0	3	0	1	4
Region 4	Alabama	1	1	5	0	0	7
	Florida	5	10	3	3	1	22
	Georgia	6	7	2	0	0	15
	Kentucky	4	3	1	3	2	13
	Mississippi	2	1	1	0	0	4
	North Carolina	9	5	2	3	0	19
	South Carolina	2	1	1	5	2	11
	Tennessee	0	2	0	1	0	3
Region 5	Illinois	5	4	2	0	2	13
	Indiana	2	4	8	4	2	20
	Michigan	5	2	4	20	2	33
	Minnesota	4	5	1	0	3	13
	Ohio	9	7	6	2	0	24
	Wisconsin	4	3	11	6	2	26

NOTE: \* Data obtained from <https://www.ams.usda.gov/local-food-directories/farmersmarkets>. Only 2018 new or updated entries analyzed. Interactive resource available at [https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/supptables\\_1\\_2](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/supptables_1_2)

## Supplementary Table 2

(Relevant Section in Journal Article: RESULTS - Farmers Markets Groups by Payment Accepted Score)

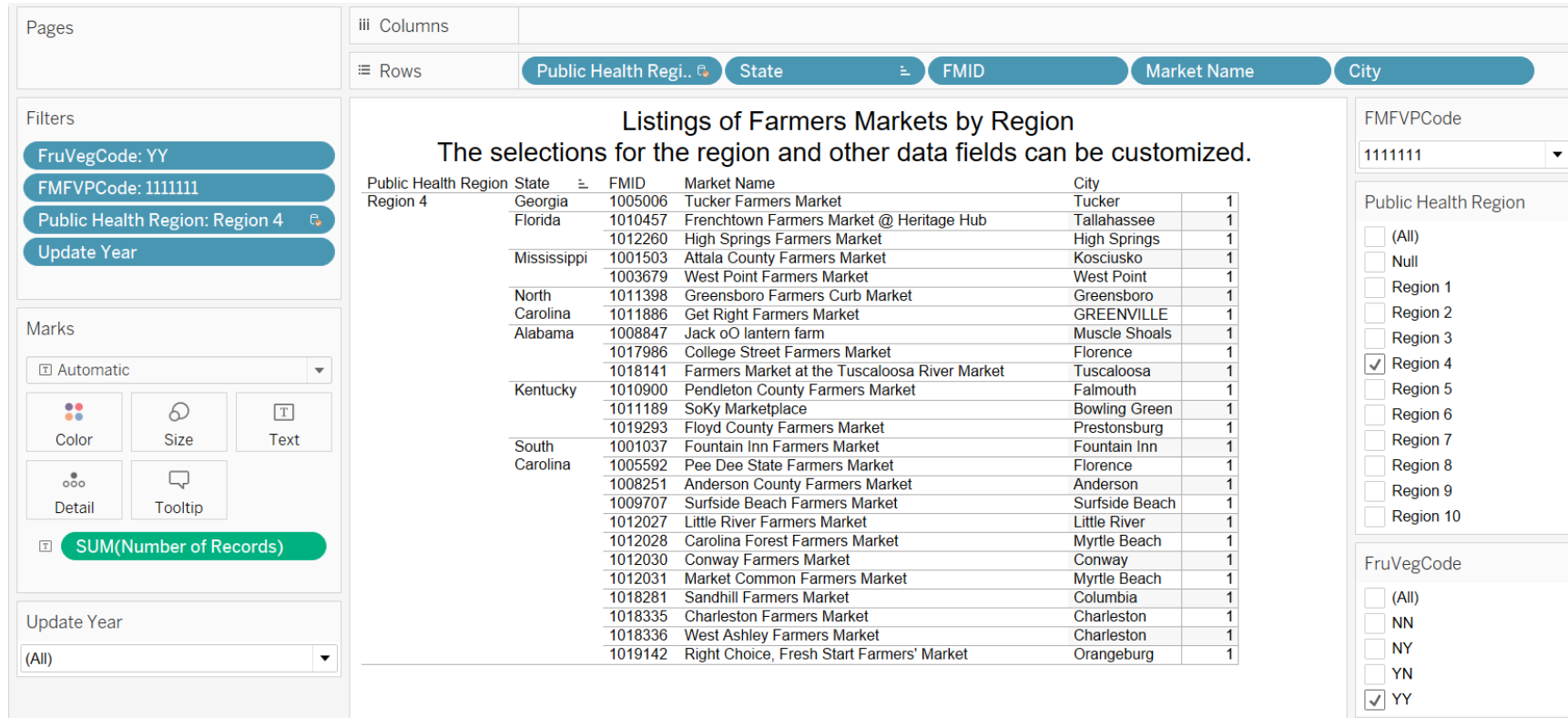
Profile of Payment Accepted Scores by Farmers Markets in Public Health Regions (6 to 10)\*

Public Health Region	State	FMPaymentScore					Farmers Market Count
		1	2	3	4	5	
Region 6	Arkansas	2	0	2	1	1	6
	Louisiana	0	2	3	4	1	10
	New Mexico	2	0	2	2	1	7
	Oklahoma	0	0	1	1	0	2
	Texas	20	7	2	1	0	30
Region 7	Iowa	0	3	2	5	4	14
	Kansas	2	2	4	0	0	8
	Missouri	8	11	0	0	0	19
	Nebraska	1	1	1	0	0	3
Region 8	Colorado	2	3	2	0	0	7
	Montana	1	2	0	2	0	5
	North Dakota	2	1	0	0	0	3
	South Dakota	3	2	0	0	0	5
	Utah	3	1	0	0	0	4
	Wyoming	1	1	0	0	0	2
Region 9	Arizona	2	0	0	0	1	3
	California	4	8	8	12	22	54
	Hawaii	1	1	0	0	0	2
	Nevada	0	0	1	2	0	3
Region 10	Alaska	2	0	0	1	1	4
	Idaho	2	5	1	0	0	8
	Oregon	0	0	1	4	10	19
	Washington	0	0	3	11	0	14

NOTE: \* Data obtained from <https://www.ams.usda.gov/local-food-directories/farmersmarkets>. Only new or updated entries in 2018 were analyzed. Interactive resource available at [https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/supptables\\_1\\_2](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/supptables_1_2)

## Supplementary Figure 3

(Relevant Section in Journal Article: Results - Farmers Markets Groups by Payment Accepted Score)

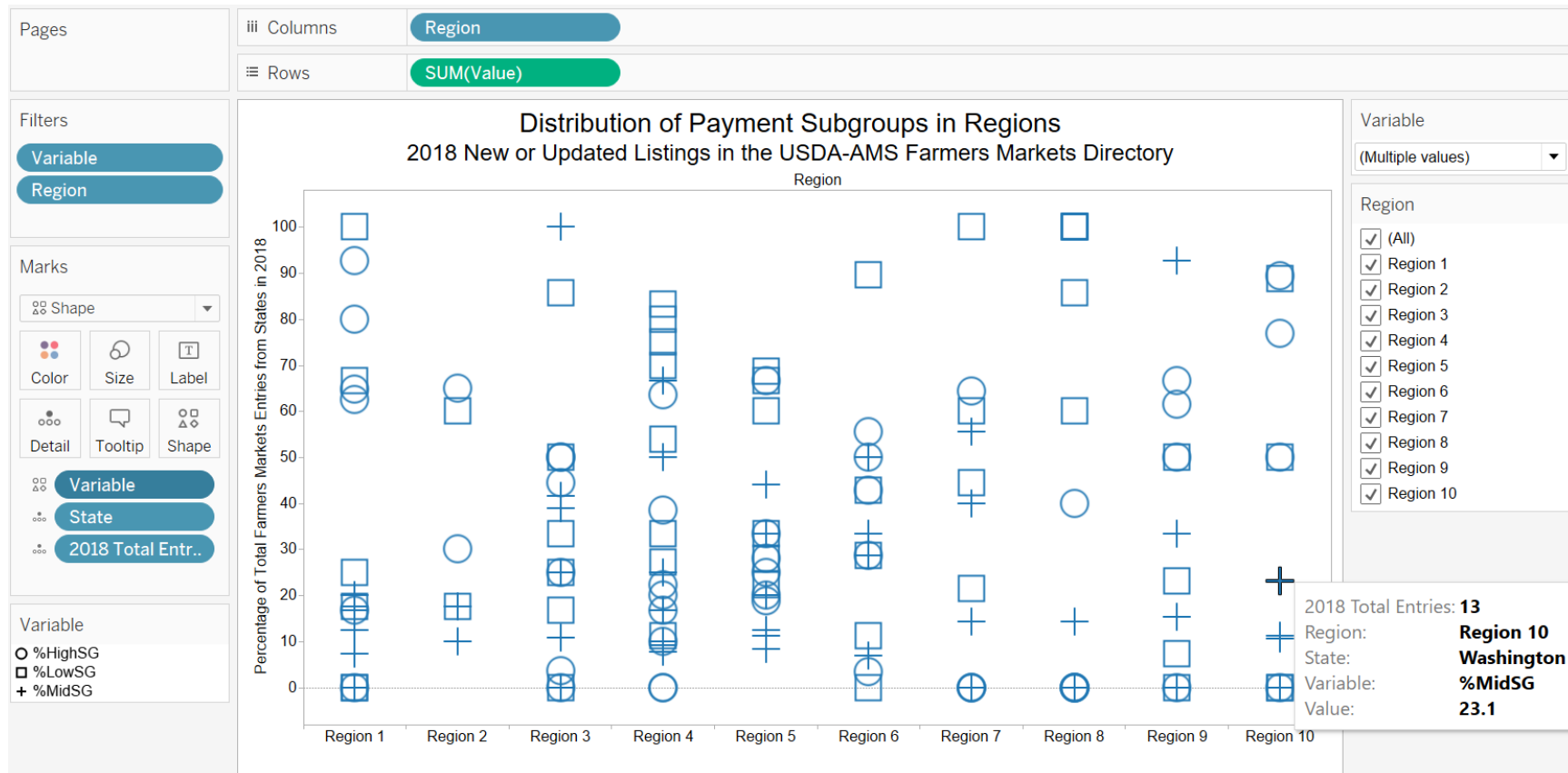


**Supplementary Figure 3** Design of an interactive view for exploring regional listings of farmers markets.

NOTE: Health Promotion Professionals can use this resource to retrieve listings according to regions and other data characteristics. The regional subgrouping of the USDA-AMS Farmers Market Directory listing is a unique feature produced by this data investigation. The view shows farmers markets in Region 4 (Southeast United States) having FMFVP Code of 111111 (Fruits and Vegetables available and all payments accepted). Interactive visualization available at [https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/supfigure3](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/supfigure3)

## Supplementary Figure 4

(Relevant Section in Journal Article: Results - Farmers Markets Groups by Payment Accepted Score)



**Supplementary Figure 4** Design of an interactive plot visualization for investigating payment score subgroups of farmers markets in regions.

NOTE: Health Promotion Professionals can for example use this resource to compare regions by the distribution of subgroups of payment scores. The types of visual marks (circle, square and plus sign) can help identify states with listings where additional advocacy efforts are needed to increase access to fruits and vegetables for beneficiaries of federal nutrition benefits. Interactive visualization is available at

[https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/supfigure4](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/supfigure4)



## Supplementary Figure 5

(Relevant Section in Journal Article: Results - Connecting Location and Payment Accepted Profile of Farmers Markets to Social Media Content)



**Supplementary Figure 5** Design of interactive dashboard for exploring regional listings of farmers markets and displaying web page.

NOTE: Health Promotion Professionals can use this resource to explore website and social media resources of farmers markets. The website of the farmers market shown confirms that payment accepted characteristics encoded by the FMFVP Code of 111111 (Fruits and Vegetables available and all payments accepted).

Interactive visualization is available at [https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/supfigure5](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/supfigure5)

## Supplementary Figure 6

(Relevant Section in Journal Article: RESULTS - Payment Accepted Score Subgroups of Farmers Markets)

### Acceptance of Women, Infants , and Children (WIC) Cash Value Vouchers at Farmers Markets

(0: Does not Accept; 1: Accepts)

Click on number to view list of farmers markets (below)

WIC_State	06_WIC_Cash	0	1
District of Columbia	23	34	
Florida	254	9	
Georgia	154	10	
Hawaii	96		
Idaho	65	1	
Illinois	317	21	
Indiana	147	50	
Iowa	181	47	
Kansas	118	2	
Kentucky	121	18	
Louisiana	79	2	
Maine	69	27	
Maryland	110	54	
Massachusetts	250	77	
Michigan	222	20	

List of  
Farmers  
Market

### List of USDA-AMS Farmers Market Directory with Filtering for Acceptance of Women, Infants, and Children (WIC) Cash Value Vouchers

Click on square for additional information and to click on online resoures (if entered in the directory).

WIC_State	County	City	FMID	MarketName	FMPaymentScore	
Florida	Alachua	High Springs	1012260	High Springs Farmers Market	5	■
		Newberry	1001596	Newberry Farmers Market	4	■
	Duval	Jacksonville	1012699	White Harvest Farmers Market	4	■
		Neptune Beach	1001852	Beaches Green Market	3	■
	Hillsborough	Temple Terrace	1019075	Temple Terrace Farmers' Market	3	■
	Leon	Tallahassee	1010457	Frenchtown Farmers Market @ Heritage Hub	5	■
	Okaloosa	Baker	1011967	Akers of Strawberries	4	■
	Pasco	Hudson	1006841	LifeGlow Foundation	3	■
	Suwannee	Live Oak	1002152	Tower View Market	3	■

**Supplementary Figure 6** Design of interactive dashboard for exploring by acceptance of Women, Infants and Children (WIC) Cash Value Vouchers.

NOTE: Health Promotion Professionals can use the resource to explore that categorize and lists farmers markets in a state by WIC CVV acceptance. The dashboard allows professional to view the website and social media resource. Interactive visualization is available at

[https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/supfigure6](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/supfigure6)

## Supplementary Figure 7

(Relevant Section in Journal Article: Results - Connecting Location and Payment Accepted Profile of Farmers Markets to Social Media Content)



**Spend a morning with us in Downtown Ormond Beach and enjoy the Farmers Market along with Art, Culture and History.**

**Supplementary Figure 7** Design of interactive dashboard for exploring by geographic location the payment score, website and social media resources of farmers markets.

NOTE: Health Promotion Professionals can use this resource to explore by geographic location the payment score, website and social media resources of farmers markets. The view display some farmers market in Florida including the Ormond Beach Farmers market located in Volusia County, Florida. Interactive visualization is available at [https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket\\_analytics/supfigure7](https://public.tableau.com/profile/datatrainer#!/vizhome/farmersmarket_analytics/supfigure7)